

Issue for the Puget Sound Partnership: Reducing Nutrient and Pathogen Pollution

Background description of the issue and why it's important to Puget Sound

Puget Sound's fresh and marine waters are vulnerable to contamination from an array of sources of human and animal wastes. These wastes degrade water quality by acting as toxins, pathogens, nutrients, physical hazards, and visual impairments. Those that are nutrients and pathogens are important because they cause illness to humans and wildlife, restriction or close shellfish harvest, limit recreational activities, and modify aquatic life processes in ways that disrupt ecosystem functions.

Controlling nutrient and pathogen pollution poses a particularly difficult challenge because sources are numerous and widespread. Thus, management can be complicated and is spread across numerous entities that exercise their authorities with varying levels of effectiveness.

Research indicates that pathogen and nutrient pollution are closely associated with the region's large and fast-growing population and rapidly urbanizing landscape. Such growth makes human sewage and anthropogenic materials flushed from the landscape or seeping to groundwater following normal precipitation, or transported via stormwater flows over impermeable surfaces, key sources.

Each day, about 900 million gallons of wastewater is discharged from more than 100 community sewage treatment plants and nearly a half million onsite sewage systems. *Is it known what proportion of the total wastewater volume is (1) direct treatment plant discharge to Sound (2) treatment plant discharge to tributaries to Sound and (3) onsite sewage?* Even while functioning at their fullest capacity, these facilities do not provide complete treatment. We depend upon the receiving waters, or the soil, to provide final treatment by assimilating the remaining contaminants.

When not properly managed, livestock and pet wastes, artificial fertilizers, commercial and recreational vessels, and other sources contribute nutrients and pathogens to the aquatic environment.

Current State – What is being done and by whom.

A wide variety of public entities are authorized in Washington law to own and operate systems of sewerage, i.e., sewage collection and treatment facilities. Ranging in size from those that treat a few thousand gallons per day to a few that treat tens of millions of gallons, these facilities operate under permits issued by the Department of Ecology that limit discharges to the surface of the ground, or marine or fresh waters. Permitted systems must meet all known and reasonable treatment (AKART) standards and prove performance by regularly testing their effluents and reporting the results. Privately

owned onsite sewage systems may be incorporated into a system of sewerage, but their regular maintenance by public entity employees is restricted.

Privately owned onsite sewage systems are largely operated by their owners with service from commercial maintenance providers. Local health jurisdictions regulate the use of these systems by enforcing rules adopted by the State Board of Health, and in some cases, more stringent local ordinances, established to protect public health. While they possess environmental protection authority, the local jurisdictions tend to limit their purview to protecting the public from exposure to pathogens and other contamination that poses a direct risk to human health. Except where expanded through agreement with the Washington Department of Health, local health regulatory authority is limited to systems whose capacity is less than 3,500 gallons per day.

The Washington Department of Health (Health) exercises limited oversight authority over the onsite sewage programs of local health jurisdictions, may enforce State Board of Health rules in local communities under certain circumstances, and directly regulates larger, non-mechanical onsite sewage systems (LOSS), whose daily operating capacities range from 3,500 to 14,500 gallons.

Health monitors and classifies shellfish growing areas and supports water quality restoration activities when they are threatened with or closed to harvest. Health, the Department of Ecology (Ecology), and Puget Sound Action Team staff support local shellfish closure districts that lead the restoration efforts of local governments, farmers, shellfish growers, tribes and others. Health is undertaking studies to assess the need for shellfish closure zones around cruise ships to minimize their impacts on shellfish harvest areas located in Puget Sound waters.

The Washington Department of Ecology (Ecology) permits LOSS having mechanical components and operating in the capacity range of 3,500 to 14,500 gpd. Ecology also permits sites where biosolids from community sewage treatment plants are applied to the land surface, and to a lesser degree, oversees and permits septage disposal sites. Discharges from larger cruise ships are limited under a formal agreement between Ecology and the Northwest Cruise Ship Association. Ecology also permits discharges from dairies.

In partnership with Ecology, the Washington Department of Agriculture administers the Dairy Nutrient Management Program to regulate large-scale animal feeding facilities and assist them in preventing pollution. The state Conservation Commission and Conservation Districts in each county educate landowners and provide voluntary and incentive programs to help landowners of small and large animal keeping operations prevent pollution.

Where are we making progress and need to maintain or accelerate it?

1. The State Board of Health adopted new onsite sewage rules in 2005. The rules require Puget Sound local health agencies to develop system inventories and

program management plans for their organizations that regulate onsite systems on the basis of their public health and environmental risk potential. The local efforts should be supported and enhanced through integration of the plans between adjacent jurisdictions and at the regional level, increased training for local regulators, and strengthened program oversight and accountability.

2. Significant progress has been made in upgrading the region's municipal sewage treatment facilities to meet secondary treatment standards. The availability of new technology and the limits on available water resources require that greater emphasis be placed on application of AKART standards that increase nutrient removal and allow wastewater reclamation and reuse.
3. Local land use planning efforts have advanced greatly in recent years. Emphasis now needs to be placed on the relationship between the land development practices and their impacts on water quality. Low impact development, clustered development, and decentralized water and sewage infrastructure should be promoted.

Comment: I would question a blanket promotion of decentralized water and sewage infrastructure. Solutions for nutrients/pathogens may involve both centralization and de-centralization depending on the location and circumstance. In some areas, centralization of wastewater treatment may be the most cost-effective way to treat diffuse wastewater sources (e.g., onsite systems or small treatment systems) with an advanced level of treatment (i.e., inorganic nitrogen removal).

4. Washington Department of Agriculture is implementing the state's Dairy Nutrient Program, and an increasing number of dairy operators are writing and implementing dairy waste management plans.
5. The Washington Conservation Commission, in cooperation with federal agencies and local conservation districts, is implementing the Conservation Reserve Enhancement Program (CREP), which provides funding for landowners to provide fencing and buffers around streams and waterbodies. This successful voluntary program will need additional funding in the future to maintain its effectiveness.

Where are we falling short and need to improve?

1. We are making little progress in developing management entities capable of responsibly managing numbers of individual onsite sewage disposal systems.
2. We are experiencing significant difficulty in convincing local authorities and citizens that there is a connection between declining water quality and their land use practices. We need to strengthen the science behind our policies and build local support for protection of the commons.

3. Incentive programs for private agricultural landowners should be linked to water quality assessment information so that these incentive programs can be targeted to the basins that need them the most.
4. Large municipal treatment facility planning should be done in a manner that links long-term planning with ongoing monitoring and assessment of the overall health of Puget Sound so that treatment can address anticipated water quality problems. For example, current studies suggest potential impacts to water quality from the discharge of chemicals associated with pharmaceuticals and personal care products. Most existing treatment facilities do not address these chemicals. Future plants should be designed to address the potential chemical impacts.

Comment: This paper is about nutrients and pathogens, not pharmaceuticals. Suggest replacing the last two sentences with statement about facility planning and permitting that assesses and responds to each facility's contribution to nutrient and pathogens problems in the Sound.

What are we not yet working on to achieve a healthy Puget Sound by 2020?

1. Nitrogen discharges to Puget Sound waters reduce dissolved oxygen levels resulting in stress and death to fish and other marine organisms. Most of the nitrogen that reaches salt water, while it may disperse from a single or many point sources, remains in the Sound. Thus, its potential impact is growing. We know dissolved oxygen levels are dropping in many parts of the Sound (58 areas), but we are not studying sufficiently the transport of nitrogen so that we can model its long range effects and develop appropriate responsive action.

Comment: There is no mention of the need for Total Maximum Daily Load (TMDL) studies by Ecology. These studies would include all the necessary source assessments, fate and transport analysis, and long range goals for point and non-point sources of pollution.

2. Ballast water, climate change, population growth, and natural variation are a few of several agents changing the mix of waterborne pathogens that require our responsiveness. Despite examples of their involvement in change, e.g., toxoplasmosis in otters, and morbillivirus in seals, we have no organized early warning system for tracking incidence and developing responses.
3. Waste discharges from on-water sources—boats of various sizes and houseboats—need to be assessed in the context of proposed “no discharge zones”.
4. Monitoring of treatment outfalls for effectiveness of system processes needs to be done.

***Comment: The meaning of this statement is unclear. One possible edit:
“Consistent monitoring of sewage treatment and significant urban stormwater outfalls for nutrients and pathogens...should be included as a requirement of NPDES permits.”***

5. There should be a more focused effort to link monitoring results for rivers, streams and marine water quality, with sources of contamination, and then to identify specific management strategies to address known inputs with specific, measurable results that will lead to a reduction and elimination of these contamination sources.

The following key actions would significantly improve management of nutrient and pathogen pollution sources:

1. Develop a computerized inventory and maps of onsite sewage disposal systems used in the region; similarly map all community sewage collection and treatment facilities; and use this information to establish a sewage management entity in each of the region's watersheds that is responsible for all sewage infrastructure.
2. Modify Washington law, that defines community sewers as “urban services” not appropriate for use outside urban growth areas, to embrace the concept of centralized management of distributed and dispersed sewage collection and treatment facilities.

Comment: See above comment about centralization.

3. Undertake research to quantify the impact of land uses on ground and surface water quality as measured by changes in mass loadings of nitrogen and phosphorus.
4. Provide additional resources to Conservation Districts to respond to burgeoning exurban development of hobby farms with guidance about appropriate waste management for novice farmers.

Our recommendations for the Partnership.

1. Envision a set of new, watershed-based entities that will do integrated sewage management with a focus on the reuse and reclamation of water from both onsite and community systems.
2. Propose stronger emphasis on responses to evidence of threatened shellfish harvest, while reinforcing the need to sustain current support for restoration in degraded areas.

3. Propose a new policy prohibiting marine outfalls and set a goal to replace (eliminate?) existing outfalls over time.

Comment: What kind of “marine outfalls” are proposed for prohibition? Obviously, major coastal cities will continue to discharge wastewater to the Sound. The technology exists to remove inorganic nitrogen (pathogen removal is probably already required), and Ecology has all the necessary authority to require installation of that technology. So far major cities (e.g., Seattle) are not required to reduce nutrient loads, apparently because assessments to date have not concluded that nutrient removal is necessary to meet water quality standards. In any case, it is unrealistic to “prohibit marine outfalls”. A better recommendation would be to strengthen assessment of nutrients in the Sound (recommendation #5 below) and tighten NPDES permits and other sewage management programs accordingly. I believe Ecology is currently undertaking such an effort in the South Sound, and there is a strong desire to do similar work in Hood Canal.

4. Leverage resources for pollution prevention and control efforts through revenue generated from safe and sustainable harvest of geoducks and other shellfish from state tidelands.
5. Recommend enhanced research, monitoring, and modeling into the relationship between nutrient pollution and eutrophication, dissolved oxygen levels, and habitat change, including quantification of the relative importance of ***known sources of nutrients, such as sewage treatment plants directly discharging to the Sound, tributary inflows, septic tank releases, forest conversion, stormwater, commercial agricultural practices and the use of chemical fertilizers.***

Comment: It would help if the scale of the proposed assessment were discussed. Are you talking about the entire Puget Sound or targeted studies at specific embayments at risk (South Sound, Hood Canal, etc)?